

Claims

Claim 1. In an oscillating transmission, a
ring⁵⁰ gear mounted for rotation, means for oscillating
said ring gear, actuating means for reversing rota-
tion of said ring gear from one direction to the
5 other, contact¹⁰⁰ means rotated by said ring gear to
contact said actuating means to reverse rotation
from one direction to the other, said contact means
being two contact members, means mounting said two
contact members for relative movement to vary the
10 angle at which said actuating means is actuated,
one contact member being mounted on said ring
gear, means for mounting the other contact member
for rotation within said ring gear, connecting
means connecting said other contact member to said
15 ring gear for being driven thereby to contact said
actuating means to reverse rotation of said ring
gear, said connecting means disconnecting said
other contact member from said ring gear when said
other contact member is rotated to vary the angle
20 between the other contact member and said one
contact member.

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Claim 2. A combination as set forth in Claim 1 wherein said other contact member and said actuating means have a locking engagement when said ring gear drives said other contact member against said
5 actuating means.

Claim 3. A combination as set forth in Claim 1 wherein said connecting means provides for movement between said other contact member and said ring gear when said other contact member is rotated
5 with respect to said ring gear.

Claim 4. A combination as set forth in Claim 1 wherein said ring gear is fixedly mounted on a hollow shaft having an output end, a cap fixed on the output end, shaft ¹¹⁶ means extending through said
5 cap into said hollow shaft engaging said means for mounting the other contact member for rotation within said ring gear to rotate said other contact member.

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5 Claim 5. A combination as set forth in Claim 4 wherein said cap has a top surface thereon, said top surface having indicia indicating the angular movement of said cap, an arrowhead on said top surface indicates one end of said angular movement while the end of said shaft means which extends through said cap member has an arrowhead for indicating the other end of said angular movement.

5 Claim 6. A combination as set forth in Claim 4 wherein said shaft means includes an interconnecting member having a torque limiting connection with said means for mounting the other contact member for rotation within said ring gear.

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5 ~~Claim 7. A combination as set forth in Claim 1~~ wherein said ring gear has an inner cylindrical surface, ~~serration means positioned around said inner cylindrical surface, said other contact member comprising a radial~~²⁴ ~~projection means extending from said means for mounting the other contact member, said connecting means comprising a~~⁶¹ ~~pointer on said radial projection engaging a serration of said serration means, movement of said~~
10 ring gear in one direction driving said radial projection to contact said actuating means.

Q2 Claim 8. A combination as set forth in Claim 7 wherein said pointer is movable over said serrations from one to the other when said other contact member is rotated to vary the angle.

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Q Claim 9. A combination as set forth in Claim 7 wherein said radial projection ^{means} and said actuating means have mating surfaces which maintain said pointer in its cooperating serration when said ring gear is driving said radial projection ^{means} to contact ^{and} said actuating means.

ditto Q3 Claim 10. A combination as set forth in Claim 1 wherein said means for mounting the other contact member for rotation within said ring gear comprises a cylindrical member, said ring gear being fixedly mounted on a hollow shaft ⁵ having an output end, said cylindrical member being mounted for rotation with said hollow shaft.

11- Claim 11. A combination as set forth in Claim 10 wherein said cylindrical member extends through said hollow shaft out of said output end, means for turning said cylindrical member to rotate said other contact member.

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Claim ~~12~~. A combination as set forth in Claim ¹³~~11~~ wherein the end of said cylindrical member extending out of said output end of said hollow shaft is closed, said cylindrical member having a nozzle opening ¹²¹ therein, means for directing a liquid through said cylindrical member to said nozzle opening.

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Claim 13. A combination as set forth in Claim 1 wherein said ring gear is fixedly mounted on a hollow shaft having an output end, a ¹⁰⁸ cap fixed on the output end, said cap having a ¹²² nozzle opening therein, means for directing liquid through said hollow shaft to said nozzle opening.

Claim 14. A combination as set forth in Claim 1 having second ³ connecting means connecting said other contact member to said ring gear for being driven thereby to contact said actuating means to reverse rotation of said ring gear, said second connecting means disconnecting said other contact member from said ring gear when said other contact member is rotated to vary the angle between the other contact member and said one contact member.

Claim ²⁰~~25~~. An oscillating transmission ✓
comprising; an input shaft ¹⁷means; an output ²gear
means; a pivoted gear cage having two drive gear
means thereon, a first clockwise drive gear means
5 and a second counter-clockwise drive gear means for
alternate driving engagement with said output gear
means to oscillate it; said input shaft means having
a ²⁶gear driving said two drive gear means, said
pivoted gear cage being pivotally mounted so that
10 in one position said first clockwise drive gear means
drivingly engages said output gear means and in a
second position said second counter-clockwise drive
gear means drivingly engages said output gear means;
a first overcenter spring means for biasing said gear
15 cage to bias one of said drive gear means or the
other into driving engagement with said output gear
means on either side of a first intermediate position
between said driving engagement positions of said
drive gear means; toggle means mounted for movement
20 relative to said gear cage between a cooperating
first and second limit means on said gear cage, said
toggle means including second overcenter spring means
for biasing said toggle means against said first or
second limit means on said gear cage on either side of
25 a second intermediate position; said first limit means,
when biased by said second overcenter spring means

through said toggle means, biasing one of said drive gear means of said gear cage into driving engagement with said output gear means along with said first overcenter spring means for rotating said output gear means in one direction; said second limit means, when biased by said second overcenter spring means through said toggle means, biasing the other of said drive gear means of said gear cage into driving engagement with said output gear means along with said first overcenter spring means for rotating said output gear means in the other direction; ^{92, 162}actuating means on said toggle means; said output gear means having contact means to contact said actuating means to move said toggle means in one direction over said second intermediate position where the second overcenter spring means will bias said toggle means to its cooperating limit means and then bias the gear cage against the bias of said first overcenter spring means; when the gear cage is moved over said first intermediate position the first overcenter spring means will join the second overcenter spring means and bias said gear cage to driving engagement changing the direction of rotation of said output gear means whereby said contact means of said output gear means will contact said actuating means on said toggle means and move said toggle means in the other direction over

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said second intermediate position where the second overcenter spring means will bias said toggle means to its other cooperating limit means and then bias the gear cage against the bias of said first over-
5 center spring means; when the gear cage is moved over said first intermediate position the first overcenter spring means will join the second overcenter spring means and bias said gear cage to driving engagement changing the direction of rotation
10 of said output gear means.

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Claim ~~16~~²⁰. An oscillating transmission as set forth in Claim ~~15~~²⁰ wherein said actuating means on said toggle means includes a first actuating contact surface and a second actuating contact surface, said
5 contact means includes a first contact means extending from said output gear means for engaging said second actuating contact surface to move said toggle means in one direction and a second contact means connected to said output gear means for engaging said
10 first actuating contact surface to move said toggle means in the other direction, said first and second contact means being positionable to provide a desired angle of oscillation.

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Claim ²²17. An oscillating transmission as set forth in Claim ²¹~~16~~ wherein one of said contact means is adjustable to vary the angle of oscillation.

Claim ²⁵18. An oscillating transmission as set forth in Claim ²⁰~~15~~ wherein said transmission has a base member, said input shaft means extending through said base member, said gear cage being pivoted
5 around said input shaft means, a projection ⁶⁻⁷extending downwardly from the pivoting end of said gear cage for passing through said first intermediate position as said gear cage moves between said driving engagement positions of said drive gear means, a recess
10 formed in said base member under the pivoting end of said gear cage to receive said projection, said recess being sized to permit said projection to swing as the gear cage pivots, first overcenter spring means in said recess for biasing said projection to
15 bias one of said drive gear means or the other into driving engagement with said output gear means.

Claim ²³19. An oscillating transmission as set forth in Claim ²²~~17~~ including means for mounting said second contact means for relative rotation with said output gear means to vary the angle between said first
5 contact means and said second contact means.

2195 Claim 20. An oscillating transmission as set forth in Claim 19 wherein said second contact means and said first actuating contact surface have a locking engagement when said output gear means
5 drives said second contact means against said first ~~actuating contact surface.~~

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Claim 21. In combination in a transmission, a
hollow output shaft having a radial flange with an annular flange extending downwardly therefrom, an internal ring gear formed around the inner surface
5 of said annular flange, serrations formed around the inner surface of said annular flange between said radial flange and said internal ring gear, gear means engaging said internal ring gear for rotating said hollow output shaft in one direction
10 and then in the other direction for oscillation, a toggle device means for changing the direction of rotation of said hollow output shaft at each end of a predetermined angle, said toggle device means having actuating means to move said toggle device
15 means in one direction or the other, means for mounting a cylindrical member for relative concentric rotation with said hollow output shaft, said cylindrical member having one end extending into said annular flange and the other end extending downwardly

therefrom, a plurality of longitudinal grooves⁵ extending along the length of the interior of said cylindrical member, said one end of said cylindrical member having a first radial projection for contact-
5 ing said actuating means and moving it in one direction, said radial projection having a pointer engaging one of said serrations, a second projection extending from the end of said annular flange for contacting said actuating means and moving it in the
10 other direction, a connector means connecting said inner surface of said hollow output shaft to the interior of said cylindrical member, said connector means having a centerbody with long vanes⁹ projecting radially therefrom for engaging said longitudinal
15 grooves, and means³ for rotating said connector means which in turn moves said cylindrical member through said long vanes overriding said serrations to vary the angle between the first radial projection and second projection.

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Claim ²²22. A combination as set forth in Claim ²⁶~~21~~
including second serrations formed around the inner
surface of said hollow output shaft, said connector
means having short¹⁵ vanes projecting from said center-
5 body for engaging said second serrations.

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Claim ~~23~~. A combination as set forth in Claim ²⁶~~21~~
wherein said hollow output shaft has an outer drive
portion for oscillation, said drive portion having
an outer cap member fixed thereto, said means for
5 rotating said connector means including a shaft with
one end connected to said connector means while the
other end extends through said outer cap member for
actuation.

data ~~Claim 24. A combination as set forth in Claim ~~23~~~~
wherein said outer cap has a top surface thereon,
said top surface having indicia indicating the
angular movement of said outer cap, an arrowhead on
5 said top surface indicates one end of said angular
movement while the end of said shaft which extends
through said outer cap member has an arrowhead for
indicating the other end of said angular movement.

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Claim ~~25~~. A combination as set forth in Claim ²⁶~~21~~
wherein said long vanes are formed to permit said
vanes to bend out of said longitudinal grooves at
a predetermined torque to prevent breakage while
5 varying the angle between the first radial projection
and second projection.

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Claim ²⁸26. A combination as set forth in
Claim ²⁸23 wherein said output cap member has a
nozzle positioned therein for directing a liquid
radially therefrom, means for directing a liquid
5 through said cylindrical member and said hollow
output shaft into said output cap member.

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~~Claim 27. An oscillating transmission having~~ ✓
an output gear, a gear cage with two drive gears,
a first drive gear and a second drive gear for
alternate driving engagement with said output gear
5 to oscillate it, means mounting said gear cage for
movement, ^{alternately} means for moving said gear cage in one
direction to drivingly engage said first drive gear
with said output gear or in the other direction to
drivingly engage said second drive gear with said
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10 output gear, ^{including} first means for biasing said gear cage
in one direction ^{or} the other direction, ^{and} second
c
p
means for biasing said gear cage in one direction
to maintain said first drive gear in driving
engagement when said first means for biasing has
15 been removed.

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Claim ³²28. A combination as set forth in Claim ³²27
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wherein said second means ^{also} is for biasing said gear cage
in the other direction to maintain said second drive
gear in driving engagement when said first means for
5 biasing has been removed.

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³⁴ Claim ³²29. A combination as set forth in Claim ³²27 including said second means biasing said gear cage in one direction for a predetermined portion of the movement of said first biasing means from said gear cage.

³⁶ Claim ³²30. A combination as set forth in Claim ³²27 including a downward ¹²¹projection on said gear cage having a surface on which said second biasing means acts, said surface being contoured to vary the effect
5 of the second biasing means.

³⁶ Claim ³²31. A combination as set forth in Claim ³²27 wherein said gear cage is mounted for an angular movement between driving engagement of said first drive gear and said second drive gear, said first
5 biasing means biasing said gear cage in one direction for one portion of said angular movement and biasing said gear cage in the other direction for another portion of said angular movement, means for removing the biasing of said first biasing means from said gear
10 cage in one direction for reversing movement of said output gear, said second means for biasing said gear cage in one direction maintaining said gear cage biased in said one direction ^{at least} until said first biasing means ^{other} is biasing said gear cage in said ~~second~~ direction.

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Claim 32. An oscillating transmission having
an output gear, a gear cage with two drive gears,
a first drive gear and a second drive gear for
alternate driving engagement with said output gear
5 to oscillate it, said first and second drive gears
both being in engagement with said output gear, an
idler gear in engagement with said first drive gear,
said second gear and said idler gear being spaced
apart, an input gear located between said second gear
10 and said idler gear, said gear cage being mounted
for pivotal movement, means for pivoting said gear
cage to bring said second gear or said idler gear
into engagement with said input gear to drive said
output gear in one direction or the other.

Claim 33. An oscillating transmission as set
forth in Claim 32 having a toggle device mounted
adjacent said gear cage for reversing its movement,
said gear cage and toggle device being mounted for
5 pivotal movement about the same axis.

Claim 34. An oscillating transmission as set
forth in Claim 33 having a base member with an
fixed upstanding, center cylindrical member, said gear cage
separate and toggle device being mounted for pivotal movement
fixed on said center cylindrical member.
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Claim 35. An oscillating transmission as set forth in Claim 33 having a base member, said toggle device being adjacent said base member, stop means being located between said toggle device and base member for limiting movement therebetween.

Claim 36. An oscillating transmission as set forth in Claim 32 including means for limiting the engagement of said input gear and said second gear to prevent an excessive operating force between the gears.

Claim 37. An oscillating transmission as set forth in Claim 33 including an input shaft, said input gear being mounted on said input shaft, a sleeve around said input shaft, said gear cage having stop means thereon, said gear cage stop means being positioned to engage said sleeve to limit engagement of said second gear or idler gear with said input gear.

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Claim 38. An oscillating transmission as set forth in Claim 34 wherein said toggle device has over-center spring means for biasing said toggle device in one direction or the other, said spring means acting between said center cylindrical member and said toggle device.

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